

# Equitable Considerations in Balancing the Energy Equation

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**Decisions concerning how we balance energy supply and demand should not be made by quantitative cost-benefit analyses alone. The distributions of costs and benefits among individuals, groups of individuals, nations, and generations raise questions of equity that need to be addressed forthrightly. Doing so can help rather than impede the decision-making process.**

Our generation certainly is not the first one to experience problems associated with equating energy supply and demand. The problems now are of greater magnitude, however, because of the greater quantity of energy involved, the necessity of considering the relative quality of energy sources, and the economic and political considerations encountered in doing so. The expertise of many professional disciplines has been applied to these problems, and it is not necessary here to recount the various failures and successes of these endeavors. I wish in this brief discussion to explore the concept of equity as an additional topic to be considered in balancing the equation.

Equity is that branch of philosophy and law that deals with the distributions of costs and benefits among individuals, groups of individuals, nations, and generations. It would be an utopian society indeed — probably an unattainable fantasy — in which each person's contribution to society equaled society's reciprocal contribution and in which any action by society resulted in equal allocations of costs and benefits among all persons.

Although these remarks constitute but an overview of this topic, it nevertheless seems important to state some assumptions before proceeding further.

- Overall energy demands will exceed supplies if we extrapolate data from the past several decades into the future.

- Not all nations will use or supply energy in the same per capita or aggregate amounts.

- Our innovative abilities will not fail us, and we will develop new energy sources and use existing sources more efficiently.

- There will be future generations, members of which will desire the widest possible range of available options in allocating resources.

- Perfect knowledge about the consequences of present actions is unattainable, but we will strive to reduce the great uncertainties under which we often act.

Each of these assumptions appears to be defensible, although no doubt some persons would prefer that they be stated somewhat differently. At any rate, I prefer to state assumptions at the outset.

Our methods for making important decisions in an increasingly technical world also are becoming increasingly technical, as exemplified by the typical cost-benefit analysis. Overlooking some philanthropic activities for the moment, no prudent person would invest time or capital if the anticipated costs were certain to exceed the anticipated benefits. In the customary cost-benefit analysis, all foreseeable costs and benefits associated with a particular course of action are assigned monetary values. All present and future costs and benefits are expressed in present values and, if the aggregate benefits exceed the aggregate costs, perhaps with a margin of error, it generally is considered economically prudent to proceed with the project. Values for future costs and benefits are discounted to the present by the opposite procedure for calculating future values of a known amount of money invested at a stated interest rate. For example, \$100 invested today at 7% interest will yield \$200 in about ten years. So, if we foresee a

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benefit of \$200 about ten years from now, its present value at a 7% discount rate is \$100.

A straightforward cost-benefit analysis is a fine analytical calculation that is appropriate for some projects (or some aspects of a project) but not for others. We must remember that not all primary, secondary, and tertiary costs and benefits can be assigned economic values. This uncertainty raises many arguments between opponents and proponents of any particular large-scale undertaking. For example, generation of electricity in coal-fired plants produces electricity and paychecks, but it also produces air and water pollutants that have various long-term adverse effects. It is not at all certain how we should assess these effects, let alone place firm monetary values on them.

It is becoming increasingly clear that we cannot concern ourselves merely with aggregate values or their ratio. We should not be satisfied with the traditional utilitarian school of philosophy and economics that promotes a societal goal of maximizing total happiness or, as a variant, average happiness. Utilitarianism does not concern itself with distinctions among persons or among classes of persons. Consider the following examples.

Is it fair that surface and subterranean water supplies downstream from surface mines be contaminated so that upstream landowners can produce coal most economically?

Is it fair that underground coal miners work in squalid conditions so that other persons can use electricity for household appliances?

Is it fair that persons suffering from respiratory diseases must involuntarily breathe air polluted by the combustion of coal?

Is it fair that the chemistry of precipitation in some large geographic regions is altered significantly by the introduction of pollutants from tall smokestacks in distant regions?

Is it fair that members of future generations be subjected to climatic changes caused by carbon dioxide and particulate matter in the atmosphere?

These are but a few of the equitable questions that arise with respect to coal-fired electric generating plants. Many others arise with respect to other elements of a national energy plan, not the least of which is safeguarding nuclear wastes for several hundred thousand years. Stating these questions is not to argue against production of electricity or the use of coal as a fuel but only to urge that all costs and benefits be considered in the decision-making process.

It does not suffice to brush these equitable considerations aside by saying that coal miners do not have to mine coal, that persons with respiratory diseases can wear respirators or can move elsewhere, that

technology someday will solve the pollution problem, or that future generations will learn to take care of altered environments without any difficulty. It is even less satisfactory to assign specious monetary values to these costs and then churn them into the traditional cost-benefit analysis, thus hiding the problems of equity behind the facade of aggregate economic analysis.

Questions concerning equitable relationship (i.e., "Is it fair . . .?") often are asked but seldom answered, apparently because their formulators believe them to be so compelling that they need no answers. Philosopher John Rawls recently outlined an ingenious method for determining whether "it is fair." (1). He asks us to consider a meeting of all persons who at any one time (e.g., the present) will inhabit our planet. The structure and function of present society would be explained to all persons in this "original position," as defined by Rawls. These persons then are given the opportunity to be assigned roles at random within present society. As Rawls says, "The veil of ignorance is absolute." Now, put yourself in this original position and ask yourself if you would have been willing to have your role in world society assigned to you by random lot. If you had voted "yes," you would have voted for the proposition that present society is equitable — that you would have traded places with anyone else and been satisfied with the allocation of costs and benefits. I would have voted "no" and thus registered my opinion that we live in an inequitable world. Note that it is not necessary for all persons in an equitable world to have equal access to resources or equal obligations to bear burdens, but only that all persons perceive that the distributions are fair.

The preceding discussion concerns what might be called horizontal equity among persons or groups of persons or nations. We also need to consider vertical equity — that which is concerned with obligations among generations. Perhaps the best-known statement on this general point was by Edmund Burke in 1790: "As the ends of [the social contract] cannot be obtained in many generations, it becomes a partnership not only between those who are living, but between those who are living, those who are dead, and those who are to be born." (2)

Philosophers have pondered at length the wisdom of a generation making the world a better place for distant generations to enjoy. As a common metaphor suggests, only the last generation lives in the completed house. Future generations can reward the earlier ones only by bestowing favorable reputations on them, but other exchanges from later to earlier generations do not exist. Since nothing can be done about this lack of reciprocity, it should not be considered an inequitable circumstance, and we may

dismiss this feature of the analysis from consideration.

Rawls would have members of all generations present at the original position agree upon how society should be ordered over time. A key item on the agenda would be determination of what constitutes a "just savings principle." Each generation would accept an obligation to set aside a specified percentage of current resources for the sole benefit of later generations. Members of the very early generations might be asked to set aside very little — indeed, just passing along sufficient genetic material might be enough. Later generations, as the "house" is nearing completion, would be expected to set aside a greater percentage of what they produced and inherited. Again, all persons in the original position would be assigned randomly to specific generations. If persons at this imaginary congress would agree on the differential rates in the just savings principle, no one in the future could find fault with how past generations managed scarce resources.

As expected, the worlds of the philosophers and the lawmakers are not always the same. It is difficult to think about a specific individual's obligations to distant generations when individual genetic contributions will be so greatly diluted. Perhaps this explains why our legal system almost uniformly favors the present over the future. Current laws do protect future interests to some extent by guarantees of property law, for instance, but laws generally burden future generations by promoting deterioration, exhaustion, or disaggregation of nonrenewable natural resources. Tax laws, for example, and other financial incentives promote "mortgaging the future," either by depriving future generations of income-producing resources or by binding them to commit financial and other resources to satisfy debts incurred today.

Although it is not difficult to find some support for bleak predictions about the welfare of future generations, reasons for optimism also are at hand. The National Environmental Policy Act (NEPA) was enacted nearly a decade ago in the United States with the policy of "fulfill[ing] the responsibilities of each generation as trustee of the environment for succeeding generations." (3). Environmental impact statements are required by NEPA for all "federal actions that significantly affect the quality of the human environment." These free us in many instances from the constraints of the cost-benefit ratio by requiring that each statement at a minimum include a description of the adverse environmental effects that cannot be avoided should the proposal be undertaken, alternatives to the proposed action, relationships between local short-term uses of the environment and the maintenance and enhancement of

long-term productivity, and irreversible and irretrievable commitments of resources that would be involved in implementing the proposed action. Descriptive prose, not mere quantitative measures, is used to ensure that all definable costs and benefits are included in the decision-making process. The full effects of NEPA probably are not appreciated even by its most ardent supporters. Other laws designed to enhance the environment and conserve our natural resources also are heartening and very well could have long-term implications greater than currently envisioned.

Still, we can do more. Transnational equity requires that we not impose on other nations those costs that we choose not to bear ourselves. We also need to work more diligently toward solution of the "free rider" problems that arise when, for example, some nations refrain from joining others in maintaining global environmental quality, thus giving them an opportunity to exploit common resources while benefiting at the same time from the conscientious actions of others. We in the United States might start by examining more critically how our disproportionate per capita use of world resources affects international cooperation in ameliorating transnational equitable issues.

The United Nations in 1972 at the Conference on the Human Environment adopted a declaration consisting of a comprehensive preamble and 26 principles that address problems of horizontal and vertical equity, among others (4). Following are three representative principles:

"The natural resources of the earth, including the air, water, land, and flora and fauna and, especially, representative samples of natural ecosystems, were to be safeguarded for the benefit of present and future generations through careful planning or management, as appropriate."

"The capacity of the earth to produce vital renewable resources was to be maintained and, wherever practicable, be restored or improved."

"The non-renewable resources of the earth were to be employed in such a way as to guard against the danger of their future exhaustion and to ensure that benefits from such employment were shared by all mankind."

The first-come-first-served attitude currently promoted in global resource development results in a race to develop resources for individual use before the common supplies are exhausted. Recognition of a problem generally is the first step toward its resolution but, quite obviously, rhetoric alone is not the solution.

George Stigler, a noted economist, once observed in a somewhat different context, "In fact I believe that each generation has an inescapable obligation to

leave difficult problems for the next generation to solve — not only to spare that next generation boredom but also to give it an opportunity for greatness. The legacy of unsolved problems which my generation is bequeathing to the next generation, I may say, seems adequate and even sumptuous" (5).

Most equitable questions do not admit of easy answers, and it certainly is easier in the short term to ignore rather than to address them. All in all, I remain cautiously optimistic about our resolve to solve our present problems with a minimum of social distress, either now or in the future. This we will not accomplish merely by increasing the energy supplies to meet an unnecessarily large energy demand nor by unreasonably decreasing the demand and thus incur-

ring unacceptable social costs. We *must* strike a reasonable balance between the two, and I therefore am confident that we will.

#### REFERENCES

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4. United Nations. Yearbook of the United Nations. United Nations, New York, N.Y., 1972, p. 318.
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